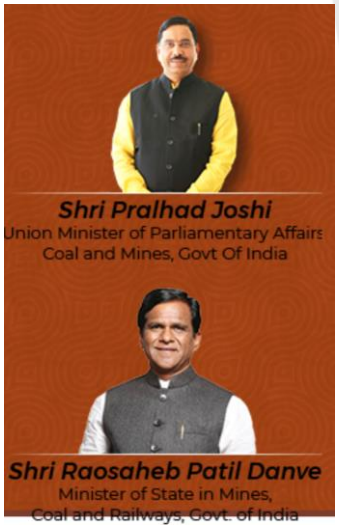
Mineral in India



Iron

Copper

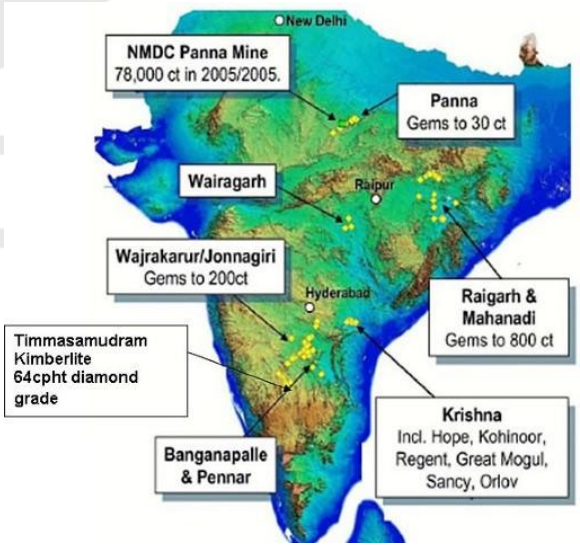
Gold

Graphite

- Graphite is a naturally-occurring form of crystalline carbon.
- It is also known as black lead.
- The carbon content in Graphite is never less than 95%.
- Graphite may be considered the highest grade of coal, just above anthracite.
- Carbon content in Peat < Lignite < Bituminous < Anthracite < Graphite < Diamond
- It is not normally used as fuel because it is difficult to ignite.
- It is found in metamorphic and igneous rocks.
- Graphite is a non-metal and it is the only non-metal that can conduct electricity.
- Total Indian Graphite Resources
- Arunachal Pradesh (43%),
- Jammu & Kashmir (37%),
- Jharkhand (6%),
- Tamil Nadu (5%) and
- Odisha (3%)
- Most of the Graphite Production is concentrated in these states
- Tamil Nadu (37%),
- Jharkhand (30%), [Palamu district in Jharkhand is the most important]
- Odisha (29%).
- Graphite Production Across the World
- China (more than 50%)
- India (20%)
- Brazil

Diamonds

Diamonds •High refractive index •Ornaments, Gemcutting	•MP(90%)>AP(6%)> CG(4%) •Mines: AP: Anantapur, Kadapa, Guntur, Krishna, TL: Mahabubnagar and Kurnool, MP:Panna, CG:Bastar



Diamonds in India

- The Vindhayan system have diamond bearing regions from which Panna and Golconda diamonds have been mined.
- Panna belt in Madhya Pradesh;
- Gravels of the Krishna river basin in Andhra Pradesh.
- Cutting and polishing of diamonds is done by modem techniques at important centres like Surat, Navasari, Ahmedabad, Palampur etc.
- The carat (ct) is a unit of mass equal to 200 mg and is used for measuring gemstones and pearls.

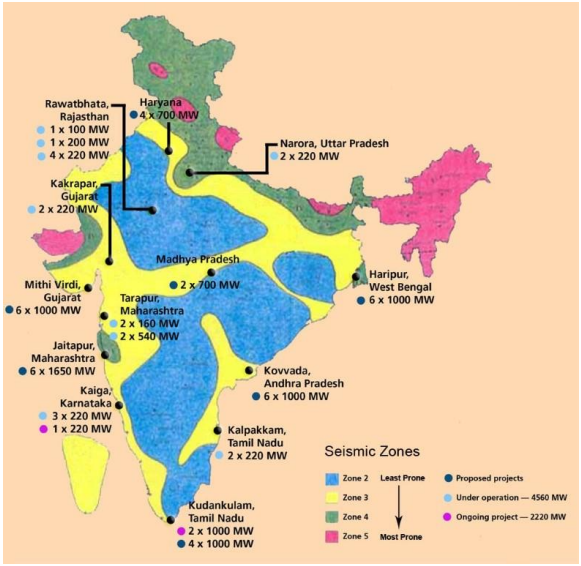
Diamonds Across the World

- The leading producers of natural diamond are Russia, Botswana, Canada, Australia, South Africa, Russia and Zaire [Congo].
- US is the largest producer of synthetic industrial diamonds
- Russia holds what is believed to be the world's largest and richest diamond resources.
- Botswana is the leading diamond-producing country in terms of value, and the second largest in terms of volume.
- Democratic Republic of Congo (DRC) is also one of the Africa's largest diamond producer.
- Australia is the leading producer of colour diamonds. Australia is famous for its pink, purple and red diamonds.
- South Africa has the most diverse range of diamond deposits in the world. Deposits include open pit and underground kimberlite pipe/dyke/fissure mining.

Limestone **•Paper mills,sugar, fertilizer, cement,steel, Bleaching powder, fuel-gas desulphurisation, Sculpture making**	•KA(27%), AP & RJ(12% each), GJ (10%), Ml(9%), TL (8%) •**Mines**- **AP**:Kurnool, **TL**:Adilabad, **CG**:Raipur, Durg **KA**:Kalburgi, **RJ**: Nagaur,Bundi, Jaipur	•RJ(20%)>MP(13%)>AP (11%) •India-**2nd** after China in cement production.

Atomic Minerals

- Uranium and Thorium are the main atomic minerals. Other atomic minerals are beryllium, lithium and zirconium.
- Uranium deposits occur in Singhbhum and Hazaribagh districts of Jharkhand, Gaya district of Bihar, and in the sedimentary rocks in Saharanpur district of Uttar Pradesh.
- But the largest source of uranium comprise the monazite sands.
- Monazite sands occur on east and west coasts and in some places in Bihar. But the largest concentration of monazite sand is on the Kerala coast.
- Some uranium is found in the copper mines of Udaipur in Rajasthan.
- India produces about 2 per cent of world's uranium. The total reserves of uranium are estimated at 30,480 tonnes.
- Thorium is also derived from monozite.
- The known reserves of thorium in India are estimated to be between 457,000 and 508,000 tonnes. Kerala, Jharkhand, Bihar, Tamil Nadu and Rajasthan are the main producers.
- Beryllium oxide is used as a 'moderator' in nuclear reactors. India has sufficient reserves of beryllium to meet her requirement of atomic power generation.
- Zirconium is found along the Kerala coast and in alluvial rocks of Ranchi and Hazaribagh districts of Jharkhand.

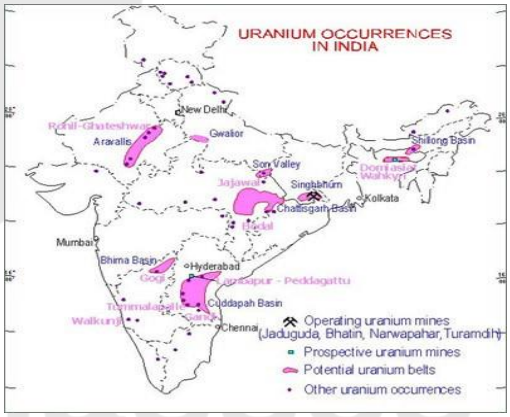


Uranium

- Uranium, thorium, and potassium are the main elements contributing to natural terrestrial radioactivity.
- Uranium has the chemical symbol U and atomic number 92.
- Uranium isotopes in natural uranium are 238U (99.27%) and 235U (0.72%).
- India has no significant reserves of Uranium. All needs are met through imports.
- India imports thousands of tonnes of uranium from Russia, Kazakhstan, France, and India is trying hard to import uranium from Australia and Canada.

- Some quality reserves were recently discovered in parts of Andhra Pradesh and Telangana between Seshachalam forest and Sresailam [Southern edge of Andhra to Southern edge of Telangana].

- The Jaduguda Mine (also spelt as Jadugoda or Jadugora) is a uranium mine in Jaduguda village in the Purbi Singhbhum district of the Indian state of Jharkhand. It commenced operation in 1967 and was the first uranium mine in India. The deposits at this mine were discovered in 1951.



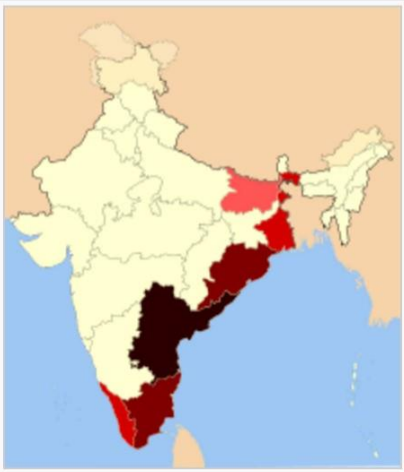
List of countries by uranium production

Rank	Country/Region	Uranium production (2013) (tonnes U)
	World	59,370
1	Kazakhstan	22,451
2	Canada	9,331
3	Australia	6,350

- Largest viable deposits are found in Australia, Kazakhstan, and Canada.
- Olympic Dam and the Ranger mine in Southern Australia are important mines in Australia.
- High-grade deposits are only found in the Athabasca Basin region of Canada.

Thorium Distribution

- Thorium is several times more abundant in Earth's crust than all isotopes of uranium combined and thorium-232 is several hundred times more abundant than uranium-235.
- United States, Australia, and India have particularly large reserves of thorium.



India's thorium is mostly found in a contiguous belt formed by its eastern coastal states.
2012 reserve estimates:[9]
35% (Andhra Pradesh, excluding Telangana)
15–20% (Tamil Nadu, Odisha)
10–15% (Kerala, West Bengal)
0–5% (Bihar)

- The Atomic Energy Commission (1948) regulates the production of uranium and thorium in the country.
- The major nuclear power plants in India are located in Narora (Uttar Pradesh), Kalpakkam (Tamil Nadu), Kota (Rajasthan) Kakrapar (Gujarat) and Kaiga (Karnataka).

Coal

- Coal is a combustible black or brownish-black sedimentary rock with a high amount of carbon and hydrocarbons.
- Coal is classified as a non-renewable energy source because it takes millions of years to form. Coal contains the energy stored by plants that lived hundreds of millions of years ago in swampy forests.
- Coal is also called black gold.
- Coal contains carbon, volatile matter, moisture, and ash & [in some cases Sulphur and phosphorous].
- Mostly used for power generation
- Different varieties of coal arise because of differences in the kinds of plant material (coal type), degree of coalification (coal rank), and range of impurities (coal grade).

- The distribution of coal in Indian is in two categories:
- Gondwana Coalfields that are 250 million years old
- Tertiary Coalfields that are 15 to 60 million years old.

- Tertiary Coal Fields

- Carbon content is very low but is rich in moisture and sulphur.
- Tertiary coalfields are mainly confined to extra-peninsular regions.
- Important areas include Assam, Meghalaya, Nagaland, Arunachal Pradesh, Jammu and Kashmir, Himalayan foothills of Darjeeling in West Bengal, Rajasthan, Uttar Pradesh, and Kerala.

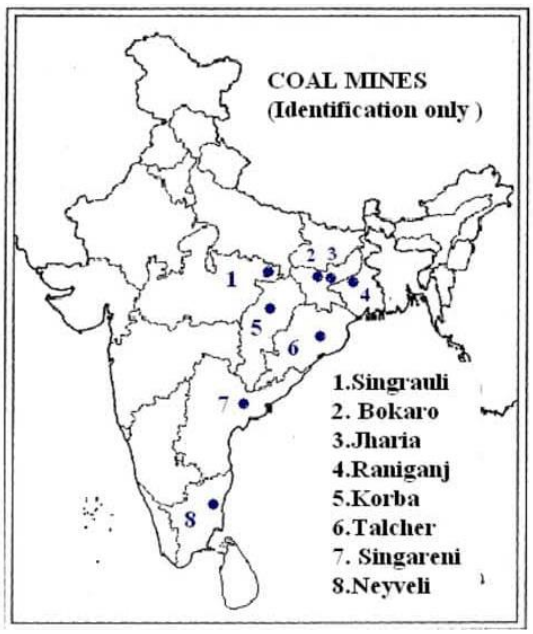
- Gondwana Coalfields

- Gondwana coal makes up to 98% of the total coal reserves in India and 99% of the coal production in India.
- Gondwana coal is free from moisture and contains phosphorus and sulphur
- The carbon content in Gondwana coal is less compared to the Carboniferous coal(that is 350 million years old which is almost absent in India because of its much younger age).
- The Damuda series (i.e. Lower Gondwana) possesses the best-worked coalfields accounting for 80 percent of the total coal production in India.
- 80 out of 113 Indian coalfields are located in the rock systems of the Damuda series[named after Damodar river].
- These basins occur in the valleys of certain rivers viz., the Damodar (Jharkhand-West Bengal); the Mahanadi (Chhattisgarh-Odisha); the Son (Madhya Pradesh Jharkhand); the Godavari and the Wardha (Maharashtra-Andhra Pradesh); the Indravati, the Narmada, the Koel, the Panch, the Kanhan and many more.

- Which state is the largest producer of coal in India?
- In FY 2020-21, Chhattisgarh registered highest coal production of 158.409 MT, followed by Odisha 154.150 MT, Madhya Pradesh 132.531 MT, and Jharkhand 119.296 MT. India's total coal production registered a marginal decline of 2.02% to 716.084 million tonnes during the last fiscal year.

Coal Reserves in India by State

Name of the state	Reserves in billion tonne	% of total reserves
1. JHARKHAND	80.71	26.76
2. ODISHA	75.07	24.89
3. CHATTISHGARH	52.53	17.42
4. WEST BENGAL	31.31	10.38
5. MADHYA PRADESH	25.67	8.51



- JHARIA:

- Located to the southwest of Dhanbad city and covers an area of 453 sq km
- Recognized as the best metallurgical coal in the country
- Supplies coal to Jamshedpur, IISCO, Bokaro, Rourkela.

- BOKARO:

- In Hazaribagh district lies within 32 km of the western end of the Jharia coal field
- Long but narrow strip in the catchment area of the Bokaro River
- Divided into West Bokaro and East Bokaro

- GIRIDIH :

- Also known as Karharbari, lies to the southwest of Girdih in the Hazaribagh district
- Has three main seams of varying thicknesses- lower Karharbari, upper Karharbari, Badhua
- Lower Karharbari gives one of the finest coking coals in India.

- KARANPURA :

- Lies to the west of Bokaro in Jharkhand has two sections- North Karanpura and South Karanpura
- Total resurve – 1059 million tonner
- Coal is believed to be of inferior quality
- According to ONGC, these fields have good reserves of coal-bed methane (CBM)

Gondwana coal fields in Chhattisgarh

Coalfield	Extent
Korba coalfield	Korba district.
Birampur coalfield	Surguja district.
Hasdo-Arand coalfield	
Chirmiri coalfield	
Lakhanpur coalfield	
Jhilmili coalfield	Shandol district & Koriya district
Johilla coalfield	Johilla valley
Sonhat coalfield	Surguja district
Tatapani-Ramkota coalfields	North-Eastern part of Surguja district

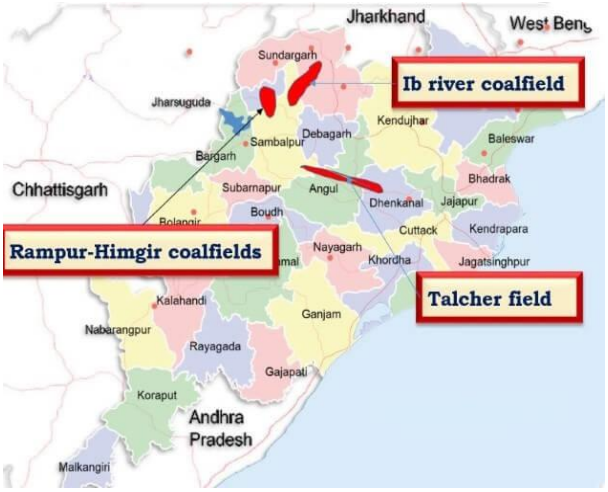
The Korba coalfield: The Korba coalfield stretches over an area of 515 sq km in the valleys of Hasdo (a tributary of the Mahanadi) and its tributaries (Ahram and Kurang) in Korba district.
Other coalfields: Hasdo-Arand, Chirmiri, Jhilmili, Johila.

Orissa

- TALCHER :

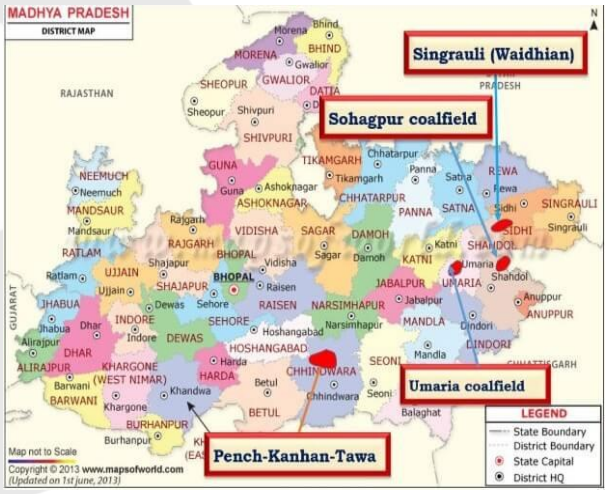
- Lies near the Talcher town of Odisha
- Second largest reserve after Raniganj
- Total reserve- 24,374 million tonnes
- Coal is utilized in thermal power and fertilizer plants at Talcher
- IB RIVER :

- 512 sq km in Sambalpur and Gangpur districts
- Coal belongs to middle and lower Barakar systems



Madhya Pradesh

- SINGRAULI :
- Largest coalfields of Madhya Pradesh in Sidhi and Shahdol districts
- Reserves- 9207 million tonnes.
- SOHAGPUR :
- Lies in the Shahdol district of Madhya Pradesh
- UMARIA :
- Situated at a distance of 58 km to the south of Katni in the eastern Madhya Pradesh
- Total reserves- 58 million tonnes
- Coal is inferior with a high percentage of moisture and ash.



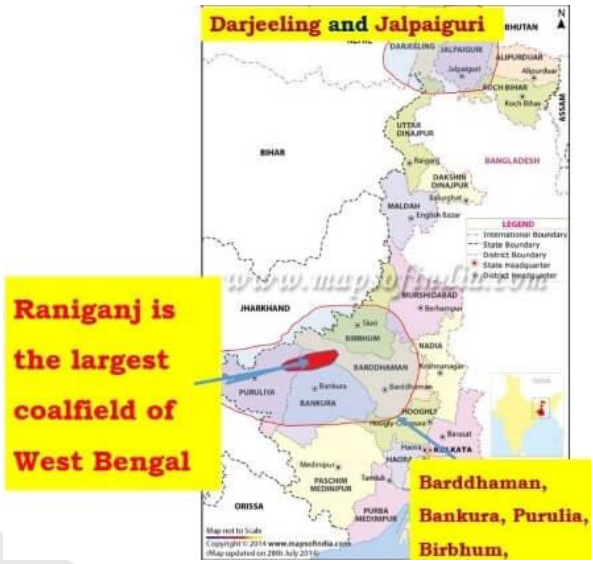
Andhra Pradesh & Telangana

- Andhra Pradesh produces about 9.72 percent of India's coal.
- Most of the coal reserves are in the Godavari valley spread over the districts of Adilabad, Karimnagar, Warangal, Khammam, East Godavari, and West Godavari.
- The actual workable collieries are situated at Singareni and Kothagudam.

West Bengal

- Although West Bengal produces only 6 percent of India's coal, the state has over 11 percent of the coal reserves of the country.
- Burdwan, Bankura, Purulia, Birbhum, Darjeeling, and Jalpaiguri are the chief producing districts.
- Raniganj is the largest coalfield of West Bengal.

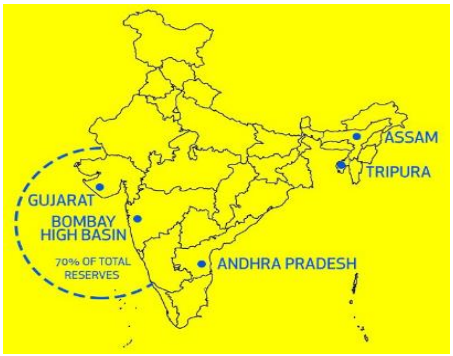
Coal mining started in India at Raniganj in 1774



Rift valley with coal seams	Distribution
Damodar valley with tributary valley	Jharkhand, West Bengal (Jharia, Raniganj)
Konar, Barakar, Bokaro valley	
Son valley	Chhattisgarh
Mahanadi valley	Chhattisgarh, Orissa
Brahmani valley	Orissa
Godavari valley with its tributaries	Maharashtra, Andhra Pradesh
Narmada valley	Madhya Pradesh

Petroleum

Mines	name of State
Digboi	Assam
Naharkatiya	Assam
Kalol	Gujarat
Ankleshwar	Gujarat
Godavari districts	Andhra Pradesh
Bassein	Maharashtra
Bombay High	Maharashtra
Ashoknagar Oilfield	West Bengal



Natural Gas

- In 1984, The Gas Authority of India was set up to monitor the sources of natural gas in the country.
- Ethane, methane, propane, butane and hydrogen sulphide are the key gaseous contributors to natural gas.
- Propane and Butane find wide usage in LPG (liquid Petroleum Gas)

- TAPI (Turkmenistan- Afghanistan- Pakistan-India) is a natural gas pipeline stretching across these four countries.
- IPI (Iran- Pakistan- India) is another natural gas pipeline covering these three nations
- The government of India has proposed to install new natural gas pipelines between Iran and India and Russia, Central Asia, and India.

MCQ

Which among the following is the oldest refinery of India?

A. Chennai

B. Digboi

C. Jamnagar

D. Panipat

Which of the following is found in the form of Monazite sand along the Kerala coast?

A. Chromite

B. Uranium

C. Thorium

D. Graphite

Assertion (A): Silver is a precious metal and it is extracted from Argentite and Chlorargyrite ores

Reason (R): India is not a major producer of silver in the world. Zawar mines in Udaipur district of Rajasthan is the major producer of silver

Codes:

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not a correct explanation of A

C. A is true but R is false

D. Both A & R is not true

When was Oil and Natural Gas Commission established?

A. 1950

B. 1951

C. 1952

D. 1956

----------are two very common diseases found in coal field workers due to Methane gas.

A. Tuberculosis and Asthma

B. Cancer and Asthma

C. Asthma and Leprosy

D. All of the above

- Match the following
- a. West Bengal 1. Raniganj
- b. Jharkhand 2. Jharia
- c. Madhya Pradesh 3. Suhagpur
- d. Odisha 4. Himgiri
- a b c d
- A. 1 2 3 4
- B. 4 3 2 1
- C. 4 1 3 2
- D. 1 4 2 3

Question	Answer
1	B
2	C
3	B
4	D
5	A
6	A